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REPORT OF THE MIKKELSEN-LEFFINGWELL EXPEDITION.

Early in September, Mr. A. H. Harrison, returning from the Arctic coast near the Mackenzie delta, brought the rumour that Captain Mikkelsen and Mr. Leffingwell, joint commanders of the Anglo-American Polar Expedition, had been away for more than two months from their camp at Flaxman Island making a sledge journey over the sea ice; as they were overdue and one or more of the dogs had returned, it was feared that the explorers were lost.

Happily, this ill-founded report was almost immediately contradicted by a despatch to the American Geographical Society from Mr. V. Stefansson, ethnologist of the expedition, who was on his way home and telegraphed from the first station he reached in Alaska. On Sept. 12, the Society received a longer despatch, signed "Mikkelsen-Leffingwell," summing up briefly the important results of their remarkable sledging expedition. Mr. Stefansson also mailed to the Society from White Horse, on Sept. 17, the detailed report, prepared by Captain Mikkelsen, of the sledge journey and the other work, past or prospective. The full report and the map and diagram accompanying it are here presented*:

"The facts I have to tell show that good and bad fortune have mingled in our experiences. We have lost our vessel, the *Duchess of Bedford*. She sprung a leak at Flaxman Island on Jan. 27 this year, and from that time, as long as she was afloat, the pumps were going almost incessantly. The leak was probably caused by the pulling out of the caulking, which the ice around the vessel had permeated. The ice contracted, drawing away from vessel and leaving cracks along her sides.

"Fortunately, with the aid of the Eskimos, we got our stores ashore without serious loss. From the beginning of the trouble till April 3, when we decided to abandon the vessel, the forecastle floor was flooded many times. Meanwhile a house was built ashore from lumber broken out of the ship. On April 11, the crew moved ashore and the ship filled rapidly. Dr. Howe, who was left in charge of the ship while we were sledging on the sea ice to the north, did not break her up, and if she could have been repaired we might have done so when we returned. But she could not be saved, and on May 17 we began to break up the hull in order to get more building material.

* This report is not dated. It was evidently sent from Herschel Island about August 1.

"The loss of the ship makes it impossible for us to proceed east to Banks Land; but this does not seem now to be important, as our discoveries this spring on the sledging expedition make the crossing of Beaufort Sea, from Banks Land to Point Barrow, of questionable value.

"Owing to the very severe weather, we were not able to start over the sea ice until March 3. We set out with five men, two of whom were a supporting party. We had supplies for 85 days and carried material for a raft. Of the seventeen dogs we had purchased, some had died and only six were worth taking out on the ice. We therefore had to buy a few dogs from the natives at high prices. They were strong animals, average weight 73.3 pounds, and the thirteen dogs we took out pulled three sledges.

"The land floe which formed last fall had been broken up on Jan. 13 by a heavy W. S. W. gale. When it froze again, it was continually rebroken by frequent westerly gales. At the time we started, it consisted of large fields of young ice, with some heavy pressure ridges.

"We made about seven miles on the first day, but camped early on account of an open water lane, too wide to be crossed. It froze over during the night and on the two days following we made small headway (only about 3 miles) over heavy, old ice, being stopped repeatedly by open water lanes. On March 6, we entered an area of very heavy rubble ice [fragmentary ice] with deep, soft snow between the fragments. From a height of 30 feet, no smooth ice could be seen. The ice surrounding us consisted of an almost fresh, whitish ice, with thinner and more salty ice on top. It was intersected by long lanes, about 6 feet deep and 4 feet wide, with sides perfectly perpendicular. The face of the break was smooth and showed the two layers of ice distinctly. It looked as if an enormous mass of young ice, one to two feet thick, had been forced up on top of very thick ice, or heavy rubble, and was broken by the process into small pieces. We worked for 5 hours with pickaxes and shovels to make a road, and hewed our way for about 200 yards. Then we dragged the sledges, with three men to a sledge, about 75 yards, when we were obliged to abandon the attempt, as our sledges broke down, being too frail and too heavily loaded for such rough ice. We returned to the ship on March 7.

"Stormy weather delayed our second departure until March 17, when we started with food for 65 days, and a total weight on the sledges of 1,226 lbs. In addition, we carried food enough for men and dogs while travelling on the lagoon ice [between the chain of

islands and the Alaskan mainland] and one week's food to be cached for our return trip. The party consisted of Mr. Leffingwell, Mr. Storkersen and myself.

"We had very bad weather immediately after our departure, and spent nearly three days in the tent. The ice off Pole Island was worse than off Flaxman Island, so we kept on to Cross Island, but were defeated in our efforts to find passable ice there on which we might get north. We decided to make one more attempt further to the west.

"We struck seaward from a small sandspit at about 149° W. Long. on March 28, and found very much better going than we had expected. The land floe extended about 4 miles off land, was level, and from ridges at its outer edge we saw to the north of it large fields of young and level ice. They extended further than we thought they could and we made very good headway. The ice was only about six inches thick. We travelled about fourteen miles the first day. As we advanced northward, we had stretches of bad ridges, on which we had to work hard with our pickaxes, without which we could not possibly have made any headway. Now and then we encountered extensive lanes of young ice, all parallel to the coast, and sometimes so thin that the ice bent under us. Traveling became worse as we advanced further from the land, and some days we only made 3 miles in ten hours. The ice consisted of last year's heavy floes, with pressure ridges and lanes covered with thin ice. Luckily, temperature was rather low (between -30° and -40° C.), so that new lanes froze over rapidly. Large rubble with soft snow between caused much trouble, and delayed our progress. Our teams were not strong enough to pull the sledges alone, so we had to pull steadily in soft, deep snow, through which it is very tiresome even merely to walk. The dogs at times sank so far in that they could do no pulling, and the crossbars of the sledges often dragged through the snow.

"The further we penetrated north, the more floes of old ice we encountered, but they were not at first very heavy or extensive. This ice is quite distinctive and we were inclined to call it palæocrystic, but, to avoid confusion, it will be denominated here simply old floes. The ice consists of very old floes, with rounded-off hummocks, the whole covered with snow of a yellowish tint, making the floes distinguishable for a great distance. The ice is perfectly fresh, and, where seen in section as exposed by breakages, it is of the same blue colour as glacier ice. The highest hummocks were about 30 feet above water level. The old floes gave us, as a rule, very good travelling.

"Up to April 3, we made some headway every day, though it was hard going, either deep soft snow or heavy pressure ridges over which we had to hew a road. From the first day out, the pickaxes were in constant use. We could not have advanced without them, as our sledges would have broken down, and, even with the greatest care both in making roads and in driving, we had to strip the under-runners from one of the sledges. On April 3, about 43 miles from land, we came upon the same kind of ice, that had stopped us off Flaxman and Cross Islands. It did not extend very far, and had within it some very small stretches of passable ice, but nevertheless, it took us five hours to cover less than 500 yards.

Just beyond this zone of bad ice, we came to the largest body of old floe we had seen thus far, and we made splendid headway. Up to this time, we had taken two soundings of 30 and 44 meters, and then we found, to our great surprise, 86 meters and no bottom, a couple of miles to the north of the heavy rubble. Our sounding-machine had not yet been rigged for work.

"The ice we crossed on the following day was heavy, but the ridges, as well as the blocks in the heavy rubble, were further apart so the wind could beat the snow hard between them, and we had floes, a mile or so in diameter, of flat-pan ice, and some of the old floe. Altogether, we made fairly good headway; but though we were very careful in estimating our daily marches, still each observation for latitude showed that we had underrated it; and yet our lead line had failed to show any appreciable drift.

"On April 7, about 64 miles off land, and 31 miles north of our last sounding with bottom, we took a sounding with the sounding-machine, and found 620 meters and no bottom. We had not expected to find such deep water so close to shore, and had not improved every opportunity to get soundings; but this deep sounding probably indicated that we were beyond the edge of the Continental Shelf. We thought there was a possibility that the sounding was taken over a submarine valley from the Colville River, and both Mr. Leffingwell and I were anxious to get further out, especially to see whether we should strike a pack of heavy and continuous old floe.

"We were disappointed that we had not fixed the edge of the Continental Shelf, if we had passed it, and if not, we were anxious to find the other side of the valley. We took several soundings, but with no better fortune. There was no drift visible on the lead-line, even when all the line was out (620 meters). But on April 9 we took our first longitude, and found that we were 20 miles to the west

of our starting-point, although, according to our dead reckoning, we should have been to the east of it. We had been believers in the generally-accepted idea of a practically immovable pack in these waters, and so had not given much attention to our longitude. But it was now evident that we had drifted to the north as well as to the west, and this accounted for the supposed underestimation of the daily marches.

"During the last few days we had, to a great extent, travelled over the heavy, old floe, and had made fairly good headway. The floes were not continuous, the largest being only about 2 miles in diameter; but they were either fairly close together, at many times separated only by a pressure ridge, or there were fields of old pan ice between them. On the western side of most of the larger bodies of old floe we found a lane, sometimes more than a half mile across, and covered chiefly with thin ice. We had only twice seen the ice in motion. Once we were stopped by a lane for more than an hour and a half, waiting for the pressure and motion to subside. On the other occasion the pressure continued only for a short time; but it was heavy. In both cases the wind was W. S. W. (true) above 10-15 miles per hour.

"At one time, while crossing a very thin stretch of young ice to the west of a large body of old floe, pressure began and lanes opened while we were in the middle of the ice. We had to work very hard to regain more solid footing; and this was not easy when we had to drag heavily-loaded sledges on wooden runners over the newly-formed ice. If our runners had been equipped with steel shoes, we could have made somewhat better progress. German silver is too soft for work in such heavy ice.

"On April 10 we came unexpectedly upon a great number of cracks, some so wide that we had to make long detours to find a crossing; others, not too wide to take the sledges over them. There had been no differential motion in the ice, as every point on one side fitted into a bay on the other; and it was the same twenty-four hours later when we returned over our old tracks. We kept on for two miles or so; but at last had to camp, as the floes were becoming smaller and smaller. The weather was rather thick; but we could see no end to the lanes, and over the northern horizon hung a very heavy water-sky.

"We began to realize that we were working without furthering the object of the expedition, as there could be little doubt now that we had passed the edge of the Continental Shelf. We were 32 miles north of the place where we first got 620 meters and no bottom,

so that the chances of the depression being a submarine valley were very small. We decided to return and to travel S. E. until we came into soundings again and then follow the edge of the shelf as far east as possible (lat. $72^{\circ} 0' 2''$ N.).

"After we began heading S. E., we were continually stopped by open and sometimes wide lanes, not yet covered with ice. The wind was light easterly. We now took, if possible, at least one time-sight a day, so as to be able to judge the drift. The first day's journey took us a little to the west of our starting-point, although the course had been S. E. and easterly; but the next day's observation corresponded very well with the dead reckoning, as the day had been calm. The wind blew up again from the E. N. E., about 20-25 miles per hour, but we made fair headway true S. E. over extensive fields of the old floe for two days, until we were stopped by a wide crack, where we found no crossing. The sun had not been visible, and we did not get a time-sight before the afternoon of April 15. It gave the unpleasant result of $150^{\circ} 01'$ W. Long. (average of two observations). Thus, instead of making twelve miles to the S. E., we had gone thirteen miles W. by S., with a difference between observation and dead reckoning of nineteen miles in longitude and five miles in latitude.

"From April 15 to 19 we had good travelling over the old floe, with thin ice interspersed. This was rather broken up, and at one place we passed 23 newly opened lanes, from 1 to 10 feet wide. They had opened very recently, as there was no ice on the water, though the temperature was -20° C.

"The wind had been W. S. W., 5 to 10 miles per hour since our last observation, and when we again had the luck to get a time-sight, it put us six miles to the west of dead reckoning, which showed that the ice had been drifting against the wind.

"The next day was spent in camp, as we desired to find the drift when a W. S. W. wind, with a force of 20 to 25 miles per hour, was blowing. A time-sight twenty-four hours after gave a drift of three miles to the east. The ice was pressing heavily all around us and we could hear far and near the grinding noise it made.

"We took soundings whenever a chance occurred, and knotted on to the 620 meter wire what spare line we had, making a total of about 690 meters; but still we could not get bottom, and that within 16 miles of the latitude, where we found bottom at 44 meters. Sledging now became a little worse, and we travelled over ice made for the greater part last fall, but badly broken with ridge after ridge extend-

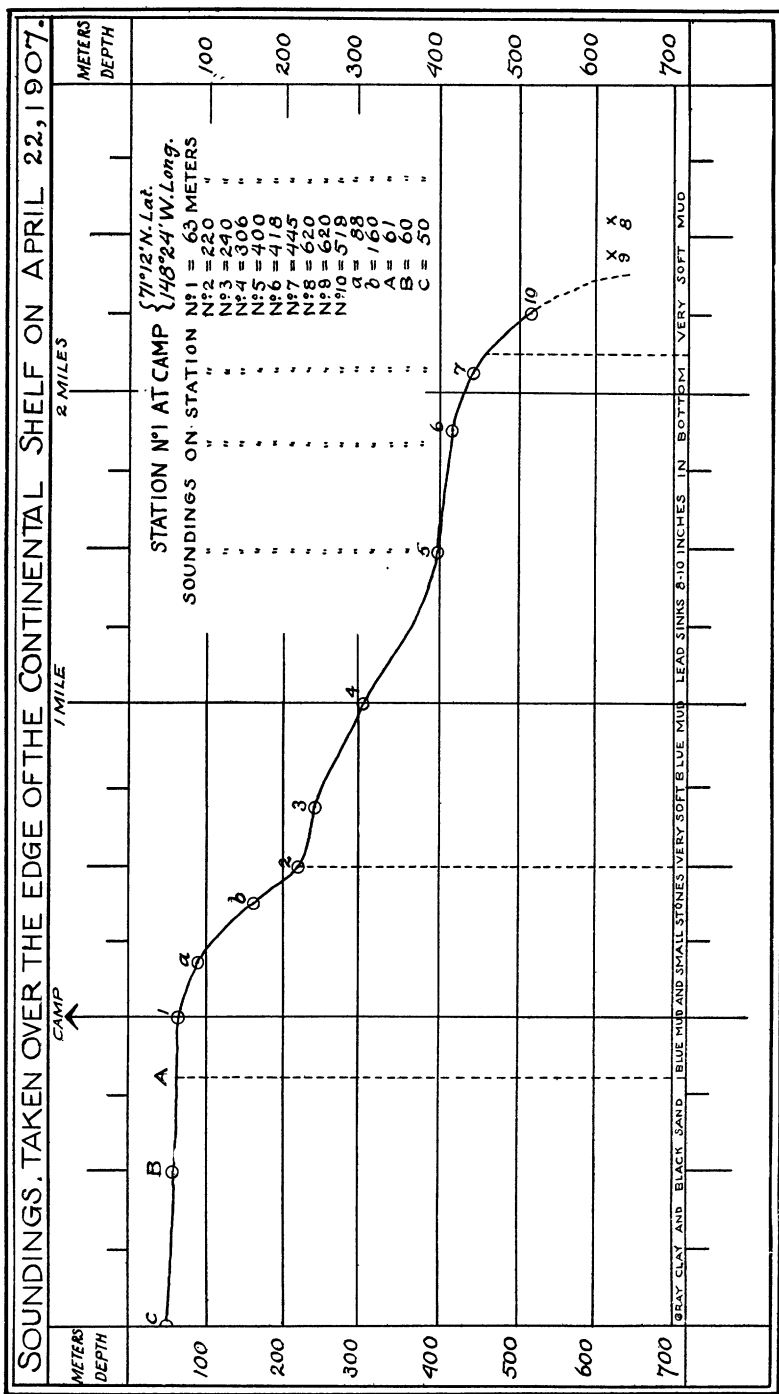
ing across our course. We witnessed the formation of several pressure ridges. Wind light westerly, five to ten miles per hour.

At last, on April 22, we got a 63 meter sounding, four miles south of a sounding of 620 meters and no bottom. We camped on the spot, and ran a line of soundings out, north and south of the camp, so as to get the slope as exactly as possible. At a depth of 88 meters there was a sudden drop to 220 meters in three-quarters of a mile. Two and a quarter miles north of the camp we had our last sounding, 519 meters, and 200 yards further out 620 meters and no bottom. Landwards we made a sounding at 50 meters, and were then stopped by a wide crack a mile south of the camp. On the last sounding we had the misfortune to lose our lead, as the wire snapped. Thereafter our light pickaxe was utilized as a lead, but it was not quite heavy enough. In 35 hours the soundings on the very edge of the deep slope increased only three meters.

"On the morning when we left this camp a wind sprung up from E. S. E., about six to eight miles per hour, and our sounding through the hole where before we had obtained 88 meters increased to 171 meters. A strong set of ice to the W. N. W. was visible. The ice opened up in lanes, and moved fast both with reference to the neighbouring floes and to the sea bottom, but there was no pressure worth mentioning. The ice we travelled over was from one to two feet thick, and had, within a few days, been pressed up into very high ridges. That this pressure was recent was shown by the fact that the salt water and slush on top of the floes, where the upheaval and pressure had depressed the ice near the ridges, were not yet frozen.

"The actual drift was, however, not very great, as observations placed us only one to two miles further west than our dead reckoning for one day's march. The wind was E. S. E., with a force of three to eight miles an hour. The weather became warmer, and on April 26 it was for the first time above freezing, making the snow still softer than before and water ran from the blocks of ice. The travelling was bad, we saw very little of the old floe, and the ice was very much broken, so that our progress was slow.

"On this date we used our raft for the first time in ferrying across a lane, about 100 yards wide. As we became more expert we could rig up the raft, ferry all our outfit across, load the sledges and be ready to start in 65 minutes. The raft was made of two nine-foot sledges, lashed together with two heavy poles, the frame thus made being covered with a piece of canvas. The raft could carry an 11-foot sledge with a load, a total of 320 pounds, with a man sitting astride, in order to pull it across. There was not much free-



board, to be sure, and we had to move carefully to keep the raft from swamping, but we had no mishap. The total weight carried extra to construct the raft was 22 pounds, of which 14 pounds was the cover. This was useful as a tent cover, and it made the tent warm and comfortable.

"The going became worse and worse, and whenever we were not travelling over the old floe (and this was rather scarce now), we had ridge after ridge, or heavy rubble, with deep, soft snow. A still worse hindrance to progress was the numerous lanes, now covered with a thin coating of ice, too thin to walk over and too thick for the raft. On April 27, we reached by far the largest body of water we had yet met, and it opened still more during the night. There was considerable differential motion in the ice now, and by travelling along the edge of the wider lanes we usually found a crossing; but it took a long time, and the going between the lanes was exceedingly bad.

"At one time, we brought up against a lane, which, at the widest, was at least a quarter of a mile across, and over which we could find no crossing. From a high ridge we saw an endless number of smaller cracks, running into a larger one to the east of that which had stopped us, and no crossing could be seen over any of them. The headline showed a rapid drift to the W. N. W., and we could not get bottom with a 520 meter line. The wind was E. N. E., about 15 miles per hour. Observations gave the discouraging result that, instead of going two miles to the E. S. E., our position was one and a half miles to the west and north of the preceding day's observation. Two of our sledges were very rigid, and we might expect a complete breakdown of either of them at any time. Our lead was lost, so we could not take soundings in deep water, and last, but not least, the permanent easterly winds with warm weather, and stronger drift to the west than we could neutralize by walking to the east, made it only too evident that we could do no more here, but had better try to reach land, an undertaking which was considerably more difficult than we had expected.

"The return march began on April 29, lat. $71^{\circ} 17' N.$, and long. $147^{\circ} 44' W.$ Unluckily, we lost our heavy pickaxe the first day. It slipped through thin ice, and our small one was too light to be of much use in the heavy ice. This pick, too, we lost two days later by the breaking of the sounding wire. The loss of the pickaxes caused us considerable extra work and many delays. It was plain to us that we could not have done anything whatever without them. Next year we shall carry two heavy ones.

"We came into soundings again in 56 meters, two miles to the south of our camp, and had a strong westerly set. The walking was very difficult, the snow was soft and deep, and there were many cracks; but our sledges were light, and we made comparatively good headway, five miles true S. S. E. However, when we had calculated our observations, they gave our true course to be W. S. W., and distance 12 miles—a rather discomfoting discovery, as we had not expected that the very light E. N. E. wind which had blown that day could have put us so much out. It was thick and cloudy weather the following four days, and our road lay through very heavy rubble and deep snow. Besides, we had many wide cracks to pass, and, by way of variety, were often compelled to crawl over pressure ridges so steep that we at times had to unharness the dogs and lift the sledges over bodily. For two days we had been heading toward three very high-pressure ridges; and, to get a good lookout, we climbed the lower one, which was at least 35 feet high. The cracks were wide, sometimes as much as 200 yards, but were full of small pieces of ice and slush, so that a man could cross most of them by jumping from one ice-cake to another. The slush was pressed together sufficiently to carry a sledge, if it were hauled rapidly, so that we took the sledges over one by one. Sometimes, however, our whole outfit was on a small cake in the middle of a wide crack, when a motion in the ice made further progress impossible, and we were for a time obliged to remain on it, as we could neither get back nor forward. The sledges often upset while shooting over the slush, and sometimes we barely missed losing a sledge and outfit, but nothing serious happened.

"Now and again we were able to get a longitude which always gave the same result—rapid drift to the west; but, as the sun was not visible at noon for six days, we were rather in the dark as to our latitude. When we finally got an observation on May 5, we found that we had been carried 71 miles to the west of our observation on April 27; and although in that time we had made about 14 miles southing, our latitude was the same.

"On May 6 we came to the largest body of water we had seen; and as we could not get around it, we had to wait for a day. In one place we could barely make out the edge on the other side, from a height of at least 25 feet. However, with so rapid a drift, the water-lane changed continually, and, by travelling from floe to floe, we reached on May 6 the edge of the pack ice. The motion was greater here than anywhere else, and, in crossing a wide lane, our tracks were displaced 150 feet in the time it took us to cover 75 feet.

"The southern edge of the pack ice was anywhere from 200 yards to a quarter of a mile away from the solid land floe, and the water was perfectly open. We had to camp and await the arrival of a big floe, on which we might cross, or for the crack to close up. The latter happened during the night, or, rather, the piece of ice on which we were camped broke loose and floated over.

"While we were waiting we had ample opportunity to watch the abundant animal life in or along the crack, in which seals were continually showing themselves. A bear, also, came close to our camp; and as we did not know how long we might have to remain in that place, it was shot for food. Ducks were seen in immense numbers, flying eastward along the crack, and we counted at one time ten flocks with at least a hundred in each. Sea gulls also were very abundant. During the entire journey over the pack we saw seals whenever we had open water, and bear tracks were numerous. Many fox tracks, too, were seen, but comparatively few close to shore. They were most abundant about fifty to seventy miles off land. One day we counted 23 fox tracks.

"The place where we finally got across to the land floe was filled with very bad ice, and we had heavy rubble with soft, deep snow until we struck the lagoon ice on May 9. We partly followed the mainland, partly the sand spits which extend along the coast, and arrived at our camp on May 15.

"On the trip we made altogether 533 nautical miles, lagoon ice and drift included, in 60 days; 361 miles of this was over the pack ice. Our average daily marches going north were 6.7 miles; heading S. E., 7.2; and southward to the lagoon ice, 2.4 miles.

"The results of the sledge expedition were not what either Mr. Leffingwell or I had hoped or expected. The conditions of the ice in Beaufort Sea were of an entirely different character from those that had been conjectured to exist. We found the edge of the Continental Shelf, and established beyond a doubt that there is a strong drift to the west with easterly winds, and hardly any, or none at all, to the east, with westerly winds.

"The old floe, which has not been reported as found to any extent outside of Beaufort Sea, gives to those who see it the impression that it is formed in a land-locked sea, and it must be exceedingly old. It certainly is of an entirely different character, and considerably older than the ice which drifts across the polar ocean, and comes down the east coast of Greenland, which I saw while serving in the Amdrup Expedition of 1900.

"An obstruction to the eastward seems to be necessary to explain

the rapid drift to the west before an easterly wind, and very little, or none, to the east before a westerly wind. But if the Continental Shelf does not trend considerably further from land than we found it (about 43 miles) and that not far to the east of where our course lay, there can hardly be room for any new land, as we know that steamers have been far to the north of Herschel Island. Last fall, for instance, the steamer Narwhal was almost 200 miles to the north of that island. Soundings north of Herschel Island seem to indicate a narrow Continental Shelf there, too; but as only a few soundings have been taken, they may be in the submarine valley of the Mackenzie River. If they are on the edge of the Continental Shelf it must run almost parallel to the coast, and not parallel to the coast mountains, as one might have supposed.

"The Eskimo reports concerning land to the north of Pt. Barrow and the reports about the island which Captain Keenan and several Eskimos thought they saw somewhere to the north and west of Harrison Bay, related probably to the heavy floe, which, seen in a certain light, conveys the idea of distant land. The fact that the Eskimo reports tell about "rounded-off hills" on the land they claim to have seen or visited strengthens this idea, for the old floe has many of these rounded elevations.

"From early fall until January 1, 1907, we took hourly tide observations at our camp and, for three days, at Icy Reef and Pole Island.

"The meteorological observations were kept up without interruption, and Mr. Leffingwell obtained several astronomical observations. In addition to this work, he followed the coast from Flaxman to Herschel I., and made many corrections in the map, some of them of much importance.

"Two days after our return from the sledge expedition he left again for the mountains inland, where he is making surveys and studying the geology of the region.

"Mr. Stefansson, our ethnologist, who went down the Mackenzie River, arrived at Herschel I. at the appointed time; but when the ship failed to come, he went to live with the Eskimos in order to learn their language and begin his ethnological labours. He travelled back and forth with them, and went as far east as Toker Point [E. of the Mackenzie delta and about 160 miles E. of Herschel I.]. He has obtained many anthropological measurements, and acquired a good knowledge of the language. As he had no trading material, he was not able to make any collections there. In the spring, he went to Herschel Island and heard from a whaler wintering there

that we were at Flaxman Island. He reached our camp while we were absent on the sledge journey. As his affairs called him again to Herschel I., he went back there with trade goods, but returned here on May 17. Since then he has made investigations in this neighbourhood and has collected old specimens of Eskimo handiwork in various parts of the island.

"Our natural history collections are small, as Mr. Ditlevsen, who was to attend to that branch, became ill, as already reported, and was compelled to leave us at Port Clarence on our way to this coast.

"As to our future work, Mr. Leffingwell will survey late this fall the chain of sand spits extending westward from here. When the whalers arrive this season, I intend to go to the east with one of them, and either take soundings from the vessel itself, while on the whaling ground, or make a cruise in the whale boat. I shall try to get a line of soundings from Cape Parry (Canada) to Nelson Head (Banks Land) and from Cape Kellett (Banks Land) westward as far as the ice will permit. I shall then return to Herschel Island and spend what time remains this season in making soundings to discover the extent of the Mackenzie submarine channel. How much of this programme can be carried out will depend upon the ice conditions.

"Next spring a sledge party will start from Demarcation Point [about 50 miles west of Herschel I.] and work northward until it gets soundings in 1,200 meters and no bottom. It will then work southward to the edge of the Continental Shelf and follow it westward. How far the edge can be traced will depend on the ice conditions; but if the westward drift proves to be as strong as it was this year, Cross Island will probably be reached. Survey work will also be carried on along the coast next season until it is time for Mr. Leffingwell to go inland in order to continue his surveys among the mountain ranges.

"If nothing unforeseen happens, we intend to go further east in a whale boat in the fall of 1908, carrying as much food as possible; and we plan to spend the fall and winter somewhere off the mouth of the Coppermine River, where there will be survey and ethnological work to do. In the spring of 1909 the party will return to the Hudson Bay post and reach the United States in the early fall of that year."

During his journey home Mr. Stefannson sent a despatch to the *World* from Yukon Crossing. It was dated Sept. 14, and in it he said:

"At Herschel I. we learned of the mistaken report sent via Hudson Bay Company's MacKenzie steamer regarding the loss of the ice party.

"I volunteered to try to reach some telegraph post in Alaska, whence a contradiction of the report could be despatched. I went to Fort MacPherson by boat, walked over the mountains for six days to reach Bell River, and floated down it alone to Fort Yukon, where I arrived on Sept. 3, twenty-seven days from Herschel Island. Dr. Howe and the crew probably will arrive in San Francisco in November."

GEOGRAPHICAL RECORD.

AFRICA.

VARIATIONS IN THE LEVEL OF LAKE CHAD.—*La Géographie*, for March, giving the results of the military studies during 1906 of the Lake Chad region, publishes notes obtained from the natives concerning variations of level in the lake. Two of the tribes assign a period of about twenty years as the limit of the ordinary small fluctuation of the lake. It seems probable from their statements that the total period may be divided roughly into five years of high water, five years of falling level, five years of low water, and five years of rise. Finally, at the end, apparently, of four or five twenty-year periods of fluctuation, there occurs an almost complete desiccation, which is followed by a great rise of level.

One old native remembered the last great drying up, which, on his evidence, is assigned to a period between 1828 and 1833; while nearly twenty years later, in 1851, the level was very high. The same native said that his grandfather told of an earlier desiccation which he had seen. During 1906 the lake was very low.

These notes seem to confirm the conclusions reached by Lieut. Boyd Alexander, who does not endorse the theory of the past few years that Lake Chad is now undergoing an exceptional period of desiccation. His view is that the present low stage of water is an ordinary phenomenon, the lake being subject to periodical changes of level.

PROF. HENRY FAIRFIELD OSBORN in his article, *Hunting the Ancestral Elephant in the Fayûm Desert* (The Century Magazine, October, 1907), presents a Map of the Region Explored by the Expedition of the American Museum. Of this map Mr. Cope Whitehouse speaks as follows (in a communication to the *New York Times Saturday Review of Books*, of October 5, p. 606):

The map printed in the *Century Magazine* is copied from that of a Mr. Beadnell. Its abundant errors are easily detected by a comparison with the maps drawn by me, or the one revised by the British War Office under my personal supervision.

It is to be regretted that Prof. Osborn had not found time to study the BULLETIN of the Society, which Mr. Whitehouse presented to him before his departure on his expedition.